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Stability study of resveratrol-loaded emulsions using pectin as an emulsifier

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Phenolic compound such as resveratrol has been suggested to prevent cancer and heart diseases because of its anti-oxidant and anti-inflammatory activities [1]. However, therapeutic application of resveratrol is quite limited due to its poor solubility, low bioavailability, photosensitive and auto-oxidation properties [2]. The aim of this study was to prepare resveratrol-loaded emulsions using pectin as an emulsifier. The emulsions should be stable for up to 7 days, before further manufacturing processes.

Resveratrol-loaded emulsions were prepared by simple homogenization using Imwitor® 742 as an oil phase (10% w/w). Resveratrol was dissolved in Imwitor® 742; solubility of resveratrol in Imwitor® 742 was 9.53 ± 0.52 mg/mL. The influence of type (i.e., low methoxy pectin (LMP) and high methoxy pectin (HMP)) and concentration (i.e., 2% and 3% w/w) of pectin on the droplet size, zeta potential, viscosity, stability (by visually observed percent creaming and automatic stability analysis) and morphology of emulsions were examined. The stability of emulsions after storage at ambient temperature (25 °C) for 7 days and under environmental stress condition (i.e., centrifugation test) was compared with the freshly prepared emulsions (day 0). The microscopic image of emulsions containing HMP (3% w/w) and resveratrol is shown in Fig. 1A. The emulsion droplet size was increased from 19.34 ± 2.6 μm (day 0) to 26.95 ± 1.76 μm (day 7). From visual observation, emulsions containing HMP (3% w/w) and resveratrol did not show phase separation (100% creaming) after centrifugation test and 7-day stability test. However, the results by automatic stability analyzer showed the difference between the emulsions after centrifugation test and 7-day stability test (Fig. 1B). It could be concluded that the emulsions containing HMP (3% w/w) and resveratrol provide the most stable emulsions compared to other formulations.

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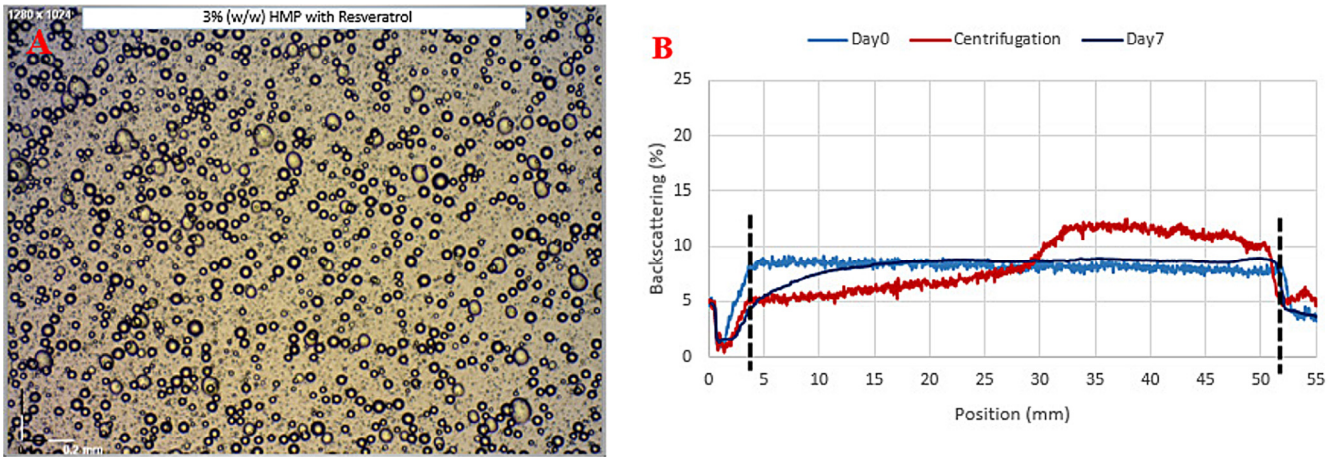

Fig. 1 – (A) Microscopic image and (B) backscattering patterns of emulsions containing HMP (3% w/w) and resveratrol.

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